

Webb Measures the Temperature of a Rocky Exoplanet



An international team of researchers has used NASA's James Webb Space Telescope to measure the temperature of the rocky exoplanet TRAPPIST-1 b. The measurement is based on the planet's thermal emission: heat energy given off in the form of infrared light detected by Webb's Mid-Infrared Instrument (MIRI). The result indicates that the planet's dayside has a temperature of roughly 450 degrees Fahrenheit and suggests that it has no significant atmosphere.

This is the first detection of any form of light emitted by an exoplanet as small and as cool as the rocky planets in our own solar system. The result marks an important step in determining whether planets orbiting small active stars like TRAPPIST-1 can sustain atmospheres needed to support life. It also bodes well for Webb's ability to characterize temperate, Earth-sized exoplanets using MIRI.

An artist's concept of the hot rocky exoplanet TRAPPIST-1 b, which is slightly larger than Earth but has around the same density, indicating that it must have a rocky composition. Webb's measurement of mid-infrared light given off by TRAPPIST-1 b suggests that the planet does not have any substantial atmosphere. The star, TRAPPIST-1, is an ultracool red dwarf just 9% the Sun's mass.

Story: <https://www.nasa.gov/feature/goddard/2023/nasa-s-webb-measures-the-temperature-of-a-rocky-exoplanet>

Paper: <https://www.nature.com/articles/s41586-023-05951-7>